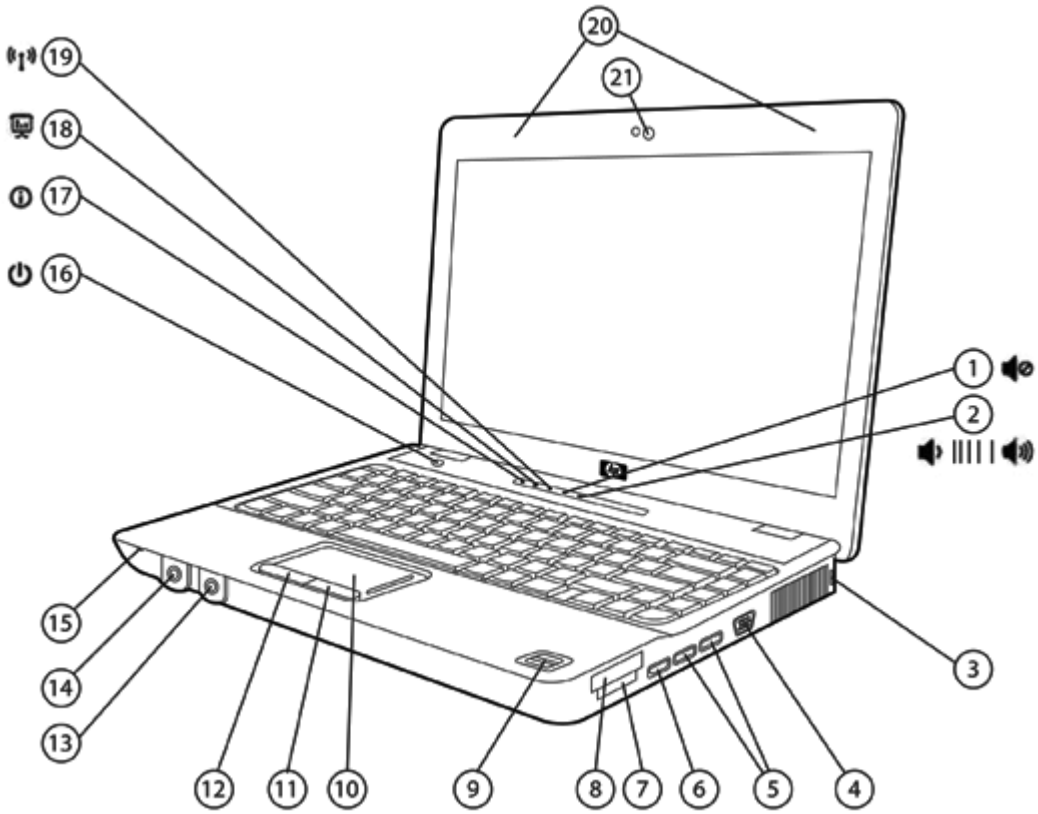
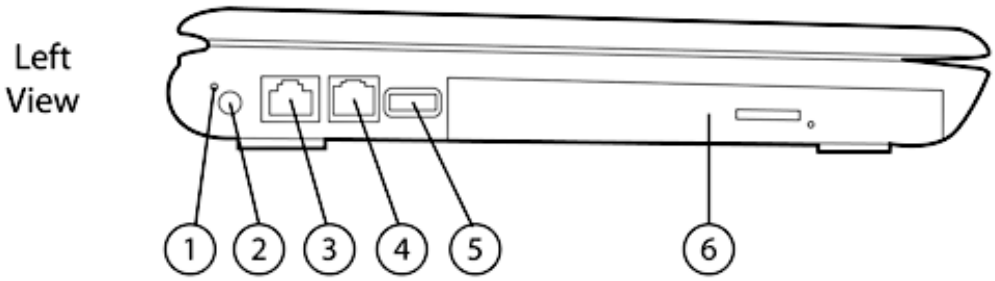
Overview

HP recommends
Windows Vista® Business

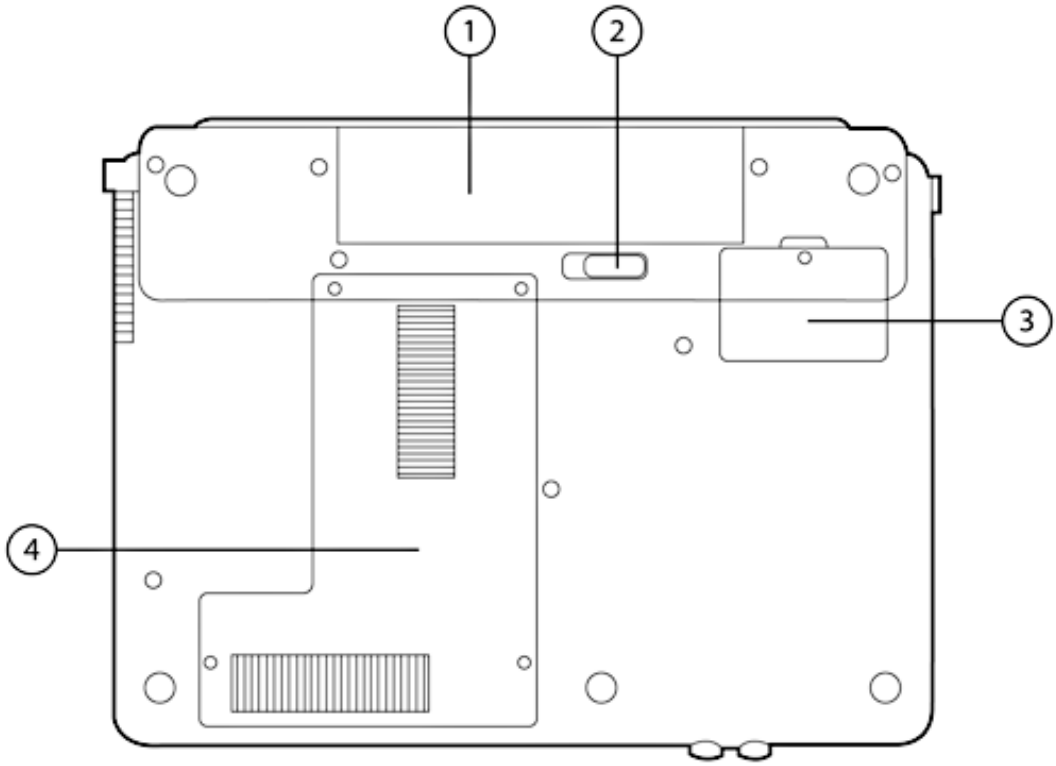


1. Volume mute button with LED indicator
2. Volume scroll zone with up/down LED indicators
3. Kensington Lock slot
4. VGA/external monitor connector
5. (2) USB 2.0 ports
6. HDMI port
7. Secure Digital (SD) slot
8. ExpressCard/34 slot
9. HP Fingerprint Sensor
10. Touchpad with scroll zone
11. Touchpad right button
12. Touchpad left button
13. Stereo headphone/line out
14. Stereo microphone in
15. Hard drive activity / HP 3D DriveGuard LED
16. Power button with LED
17. HP Info Centre button with LED indicator
18. HP Presentation button with LED indicator
19. Wireless on/off button with LED indicator
20. Integrated dual-array microphone
21. Optional VGA webcam

Overview



1. Battery charging LED
2. Power connector
3. RJ-45/Ethernet port
4. RJ-11/modem port
5. USB 2.0 ports
6. Optical drive



1. Battery bay
2. Battery release latch
3. WLAN module compartment (select models)
4. Hard Drive and Memory bay

Overview

At A Glance

- Genuine Windows Vista Business 32, Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed, Genuine Windows Vista Home Basic 32, or FreeDOS (select countries)
- Thin lightweight design starting at 4.07 lb/1.85 kg and 1.1 inch/28mm thin at front
- Widescreen 12.1-inch diagonal display with optional BrightView
- Flexible wireless connectivity options:
  - Integrated 802.11 a/b/g/n draft 2.0, a/b/g, b/g wireless LAN module
  - Bluetooth® 2.0
- Intel® Core™2 Duo processors
- Integrated optical drive
- Integrated SD/MultiMedia Card Reader
- Enhanced security features including HP ProtectTools Security Manager and HP Fingerprint Sensor
- Optional integrated VGA webcam
- Up to 500 GB 5400 rpm user-removable hard drive with HP 3D DriveGuard protection
- Up to 8 GB of 800-MHz DDR2 SDRAM, dual channel memory support
- Touch-sensitive controls for HP Info Centre, HP Presentation button, wireless on/off, mute, and volume up, volume down
- Intel Mobile Chipset Family with integrated graphics
- Marvell Gigabit Ethernet Controller (10/100/1000 NIC)
- Touchpad with scroll zone

Standard Features

Processors

Intel Core 2 Duo Processor T9600 (2.8 GHz, 6 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor T9400 (2.53 GHz, 6 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor P9500 (2.53 GHz, 6 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor P8700 (2.53 GHz, 3 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor P8600 (2.40 GHz, 3 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor P8400 (2.26 GHz, 3 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor P7370 (2.0 GHz, 3 MB L2 cache, 1066 MHz FSB)*
Intel Core 2 Duo Processor T6570 (2.10 GHz, 2 MB L2 cache, 800 MHz FSB)*
Intel Core 2 Duo Processor T5870 (2.0 GHz, 2 MB L2 cache, 800 MHz FSB)*
Intel Core 2 Duo Processor T5670 (1.8 GHz, 2 MB L2 cache, 800 MHz FSB)*
Intel Pentium Dual-Core Processor T4200 (2.00 GHz, 1 MB L2 cache, 800 MHz FSB)*
Intel Pentium Dual-Core Processor T3400 (2.16 GHz, 1 MB L2 cache, 667 MHz FSB)
Intel Pentium Dual-Core Processor T3200 (2.0 GHz, 1 MB L2 cache, 667 MHz FSB)
Intel Dual-Core Celeron Processor T1700 (1.83 GHz, 1 MB L2 cache, 667 MHz FSB)
Intel Dual-Core Celeron Processor T1600 (1.66 GHz, 1 MB L2 cache, 667 MHz FSB)
Intel Celeron Processor 585 (2.16 GHz, 1 MB L2 cache, 667 MHz FSB)*
Intel Celeron Processor 575 (2.00 GHz, 1 MB L2 cache, 667 MHz FSB)*

* Intel's numbering is not a measurement of higher performance.

NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

Operating System

Preinstalled	Genuine Windows Vista Business 32* Genuine Windows Vista Business 32 with downgrade to Windows XP Professional custom installed*† Genuine Windows Vista Home Premium 32* (limited availability) Genuine Windows Vista Home Basic 32* Red Flag Linux (PRC only) FreeDOS
Supported	Genuine Windows XP Professional
Certified	SuSe Linux Enterprise Desktop 10

* Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor.

† Windows Vista Business disk also included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.

Standard Features

Chipset		Mobile Intel GM45 Express Chipset ICH9M-Enhanced, 1066 MHz front side bus (models with integrated graphics) Mobile Intel GL40 Express Chipset, 667 MHz front side bus (models with integrated graphics)
Graphics		Mobile Intel Graphics Media Accelerator 4500MHD, up to 384 MB of shared system memory Microsoft DirectX10 capable
Display	**Internal**	12.1-inch diagonal WXGA anti-glare (1280 x 800 resolution) 12.1-inch diagonal WXGA BrightView (1280 x 800 resolution)
	External	Up to 32-bit per pixel color depth **VGA** port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz **HDMI** 1.3 port supports direct connection to high-definition displays with up to 1920 x 1080 resolution and 7-channel audio with one convenient cable (not included) **NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.
Memory	**Standard**	800 MHz DDR2 SDRAM; two slots supporting dual channel memory 1024 MB or 2048 MB
	Maximum	Upgradeable to 8192 MB with 4096 MB SODIMMs in slots 1 and 2
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.
		NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.
Communications		Marvell Ethernet (10/100/1000 NIC)* 56K V.92 modem** * The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. ** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.

Standard Features

Wireless Devices	Support for a broad range of secure, integrated wireless LAN options featuring support for the latest industry standards. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN options.	
	All 802.11 integrated wireless LAN options	Wi-Fi certified* Cisco Compatible Extensions support Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP Advanced Encryption Standard (AES) support Dual antennas integrated in the display enclosure
	Intel WiFi Link 5100	Integrated support for 802.11a, b, g, and n draft 2.0* Up to 300 mbps data rate
	Broadcom 4322AGN 802.11a/b/g/draft-n Wi-Fi Adapter	Integrated support for 802.11a, b, g, and n draft 2.0* Up to 300 mbps data rate
	Broadcom 4312G 802.11b/g WiFi Adapter	Integrated support for 802.11 b and g Up to 54 mbps data rate
	HP Integrated Module with Bluetooth Wireless Technology	Bluetooth Specification v2.0 compliant Works with a wide range of Bluetooth devices
	* The specifications for 802.11n draft 2.0 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11n WLAN devices. In countries where n draft 2.0 is not allowed, this capability is not enabled.	
Keyboard	The 101/102-key compatible keyboard features an industry standard, full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. US and International key layouts are available. Other features include an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features, 19 mm x 19 mm key pitch (center-to-center spacing), 2.5 mm stroke, and comfort-dished keycaps.	
Touch-sensitive controls	Touch-sensitive controls provide easy access to the following features: HP Info Center, HP Presentation button, wireless on/off, mute, and volume up, volume down	
Pointing device	Touchpad with scroll zone, two pick buttons	
Expansion card slots	**ExpressCard/34 slot**	Supports ExpressCard/34 (34 mm x 75 mm x 5 mm) card sizes
	Secure Digital (SD) slot	Supports SD (Secure Digital), MultiMedia Card cards

Standard Features

Storage	**Hard drives**	120/160/250/320/500 GB 5400 rpm SMART SATA
	NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 10 GB is reserved for the system recovery software.	
	HP 3D DriveGuard	The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive. Uses three-axis digital motion detection with intelligent sensitivity to help protect the hard drive during normal use from shock and vibration. The digital accelerometer temporarily halts all data transfer and parks the hard drive when abrupt motion is detected.
	Fixed optical drives	DVD-ROM Drive DVD/CD-RW Combo Drive DVD+/-RW SuperMulti DL LightScribe Drive
Interfaces	**ExpressCard/34 slot**	One
	External monitor	One – VGA
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem	One
	RJ-45/Ethernet	One
	HDMI	One – 1.3 compliant
	USB 2.0	Three
	SD/MultiMedia Card reader	One
	LED status indicators	Thirteen
Audio/Visual	High Definition Audio support w/24-bit DAC Integrated stereo speakers Integrated dual array digital microphone Touch-sensitive controls for volume up, volume down, and mute Stereo headphone/line out Stereo microphone in Optional VGA webcam	

Standard Features

Software	**Preinstalled software with Windows Vista or Windows XP**	PDF Complete HP Recovery Manager HP Help and Support Center HP Universal Print Driver HP ProtectTools Security Manager: BIOS Configuration for HP ProtectTools Credential Manager for HP ProtectTools Drive Encryption for HP ProtectTools HP Quick Launch Buttons HP Wireless Assistant Microsoft Office Ready with 60-day Office Professional 2007 Trial Edition (select models) Roxio Creator Business (for optional DVD+/-RW and DVD/CDRW drives Synaptics Touchpad Driver McAfee Total Protection Intervideo WinDVD – DVD Player Microsoft Windows Live Messenger (select models)
	Additional software available from the web	HP SoftPaq Download Manager HP Client Manager Software HP Client Management Solutions * 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

HP Recovery Manager	Each unit is shipped with HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 10 GB of the hard drive is reserved for the system recovery software.
SMBIOS Version 2.4	System Management BIOS, previously known as DMI BIOS, is used to store system management information.
HP ProtectTools Security Manager	HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. Modules currently available are: • BIOS Configuration for HP ProtectTools • Credential Manager for HP ProtectTools • Drive Encryption for HP ProtectTools • File Sanitizer for HP ProtectTools • Set-up Wizard for HP ProtectTools

Standard Features

Security	**Standard Features**	HP ProtectTools Security Manager Enhanced Pre-Boot Security HP SpareKey One-Step Logon HP Fingerprint Sensor Configuration Control Hardware Memory Change Alert Ownership Tag Setup Password Power-On Password HP Disk Sanitizer HP 3D DriveGuard Kensington Lock Slot Support for Computrace / LoJack for Laptops (must be purchased separately)
	For more information on HP security solutions refer to: http://www.hp.com/go/security.	
Power Supply	External 65-watt Smart AC adapter 6-foot (1.8-meter) power cord included; total length including external AC adapter is 12 feet (3.66 meter). HP Fast Charge* *HP Fast Charge recharges your battery up to 90% within 90 minutes when the system is off.	
Battery	**Primary Battery**	4-cell (37 WHr) Lithium-Ion battery 8-cell (73 WHr) Lithium-Ion battery

Battery Life		**4-cell**	**8-cell**
	Primary battery	Up to 3.5 hours	Up to 8 hours
	NOTE: The listed battery life measurements were taken on models running Microsoft Windows Vista. Battery life will vary depending on the product configuration, product model, applications loaded on the product, power management settings of the product, and the product features used by the customer. As with all batteries, the maximum capacity of this battery will decrease with time and usage.		
System Standby Time	Up to 1 week		

Power Conservation	Supports enhanced Intel SpeedStep technology with Intel Core 2 Duo processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode) Intel Display Power Saving technology Hibernation Standby ACPI compliance
Docking and Stands	N/A

Standard Features

Service and Support	Limited1-year warranty; 1-year limited warranty on primary battery. Warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. **NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.

Select Model(s)

2230s KS057UT#ABA (English) KS057UT#ABC (Fr CAN) Smart Buy	**Processor**	Intel® Core™2 Duo Processor T5670 (1.80 GHz, 800 MHz FSB, 2 MB L2 cache)
	Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
	System Memory	1024MB 800MHz DDR2 SDRAM (1 DIMM)
	Hard Drive	120GB 5400rpm SATA Hard Drive
	Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
	Display	12.1 inch diagonal, WXGA, BrightView (1280 × 800)
	Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n)
	Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
	Pointing Device	Touchpad with scroll zone, two pick buttons
	Battery	4-cell (37 WHr) Lithium-Ion battery
	Power	External 65W adapter
	Warranty	Limited 1 year standard parts and labour warranty

Standard Features

2230s KS058UT#ABA (English) KS058UT#ABC (Fr CAN) Smart Buy	**Processor**	Intel® Core™2 Duo Processor P8400 (2.26 GHz, 1066 MHz FSB, 3 MB L2 cache)
	Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
	System Memory	2048MB 800MHz DDR2 SDRAM (1 DIMM)
	Hard Drive	160GB 5400rpm SATA Hard Drive
	Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
	Display	12.1 inch diagonal, WXGA, BrightView (1280 × 800)
	Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n)
		HP Integrated Module with Bluetooth® Wireless Technology
	Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
	Pointing Device	Touchpad with scroll zone, two pick buttons
	Battery	4-cell (37 WHr) Lithium-Ion battery
	Power	External 65W adapter
	Warranty	Limited 1 year standard parts and labour warranty

2230s KS059UT#ABA (English) KS059UT#ABC (Fr CAN) Smart Buy	**Processor**	Intel® Core™2 Duo Processor T9400 (2.53 GHz, 1066 MHz FSB, 6 MB L2 cache)
	Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
	System Memory	3072MB 800MHz DDR2 SDRAM (2 DIMM)
	Hard Drive	250GB 5400rpm SATA Hard Drive
	Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
	Display	12.1 inch diagonal, WXGA, Anti-Glare (1280 × 800)
	Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n)
		HP Integrated Module with Bluetooth® Wireless Technology
	Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
	Pointing Device	Touchpad with scroll zone, two pick buttons

Standard Features

	Battery	4-cell (37 WHr) Lithium-Ion battery
	Power	External 65W adapter
	Warranty	Limited 1 year standard parts and labour warranty

2230s KS060UA#ABA (English) KS060UA#ABC (Fr CAN)	**Processor**	Intel® Core™2 Duo Processor T5870 (2.00 GHz, 800 MHz FSB, 2 MB L2 cache)
	Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
	System Memory	2048MB 800MHz DDR2 SDRAM (1 DIMM)
	Hard Drive	160GB 5400rpm SATA Hard Drive
	Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
	Display	12.1 inch diagonal, WXGA, BrightView (1280 × 800)
	Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n)
	Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
	Pointing Device	Touchpad with scroll zone, two pick buttons
	Battery	4-cell (37 WHr) Lithium-Ion battery
	Power	External 65W adapter
	Warranty	Limited 1 year standard parts and labour warranty

2230s KS061UA#ABA (English) KS061UA#ABC (Fr CAN)	**Processor**	Intel® Core™2 Duo Processor P8600 (2.40 GHz, 1066 MHz FSB, 3 MB L2 cache)
	Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
	System Memory	2048MB 800MHz DDR2 SDRAM (1 DIMM)
	Hard Drive	250GB 5400rpm SATA Hard Drive
	Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
	Display	12.1 inch diagonal, WXGA, Anti-Glare (1280 × 800)
	Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem

Standard Features

Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n) HP Integrated Module with Bluetooth® Wireless Technology
Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
Pointing Device	Touchpad with scroll zone, two pick buttons
Battery	4-cell (37 WHr) Lithium-Ion battery
Power	External 65W adapter
Warranty	Limited 1 year standard parts and labour warranty

2230s
KS062UA#ABA (English)
KS062UA#ABC (Fr CAN)

Processor	Intel® Core™2 Duo Processor T9400 (2.53 GHz, 1066 MHz FSB, 6 MB L2 cache)
Operating System	Genuine Windows Vista® Business with downgrade to Windows XP Professional custom installed w/MS Office (Trial)
System Memory	3072MB 800MHz DDR2 SDRAM (2DIMM)
Hard Drive	320GB 5400rpm SATA Hard Drive
Optical Drive	DVD+/-RW SuperMulti DL LightScribe Drive
Display	12.1 inch diagonal, WXGA, Anti-Glare (1280 × 800)
Graphics	Mobile Intel® Graphics Media Accelerator 4500MHD, up to 384 MB of shared memory
Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
Integrated Wireless	Intel® WiFi Link 5100AGN (802.11a/b/g/draft-n) HP Integrated Module with Bluetooth® Wireless Technology
Integrated Security	Drive Encryption for HP ProtectTools HP Fingerprint Sensor
Pointing Device	Touchpad with scroll zone, two pick buttons
Battery	4-cell (37 WHr) Lithium-Ion battery
Power	External 65W adapter
Warranty	Limited 1 year standard parts and labour warranty

Options

Memory	HP 1 GB (DDR2 800 MHz) SODIMM	KT292AA
	HP 2 GB (DDR2 800 MHz) SODIMM	KT293AA
	HP 4 GB (DDR2 800 MHz) SODIMM	KT293AA
Other Storage	HP Notebooks USB Diskette Drive	DC361B
Power	HP 65W Smart AC Adapter	ED494AA#xxx
	HP 90W Smart Auto Adapter	ED493AA
	HP 65W AC/Auto/Air Combo Smart Adapter	ED993AA#xxx
	HP 4-cell Primary Battery	TBD
Carrying Cases	HP Value Nylon Case	RR314AA
	HP Basic Carrying Case	AJ078AA
	HP Universal Nylon Case	RR315AA
	HP Executive Leather Case	RR316AA
	HP Deluxe Nylon Backpack	RR317AA
	HP Universal Messenger Bag	GD404AA
	HP Deluxe Roller Case	GD405AA
Security	HP/Kensington MicroSaver Security Lock	PC766A
Input/Output Devices	HP USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP USB Optical Travel Mouse	RH304AA

Memory

Support for up to 8192 MB of 667/800-MHz DDR2 SDRAM
Two DIMM slots supporting dual channel memory
DIMM sizes supported: 1024 MB, 2048 MB, and 4096 MB

Standard Memory

- 1024 MB (1024 MB x 1)
- 2048 MB (2048 MB x 1 or 1024 MB x 2)
- 3072 MB (2048 MB x 1024 MB)
- 4096 MB (2048 MB x 2)

Optional Memory Upgrades

Support for up to 8192 MB of memory is available (with the installation of optional DDR2 SDRAM memory kits). Both memory slots are user accessible. Please refer to the Hardware and Software Guide for installation procedures. Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

Up to	Slot 1	Slot 2
1024 MB	1024 MB	Empty
2048 MB	1024 MB	1024 MB
3072 MB	2048 MB	1024 MB
4096 MB	2048 MB	2048 MB
8192 MB	4096 MB	4096 MB

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Memory Upgrades

HP 1 GB (DDR2 800 MHz) SODIMM	KT292AA
HP 2 GB (DDR2 800 MHz) SODIMM	KT293AA
HP 4 GB (DDR2 800 MHz) SODIMM	KT293AA

Storage

Removable Media Drive Support

	Quantity Supported	Drive Bay
DVD-ROM	One	Fixed optical drive bay
DVD/CD-RW Combo Drive	One	Fixed optical drive bay
DVD+/-RW SuperMulti DL Drive	One	Fixed optical drive bay
Blu-ray ROM DVD+/-RW SuperMulti DL Drive	One	Fixed optical drive bay

Hard Drive Support

	Quantity Supported	Drive Bay
Primary Hard Drives		
120-GB 5400 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
160-GB 5400 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
250-GB 5400 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
320-GB 5400 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
500-GB 5400 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
160-GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay

Technical Specifications

System Unit	**Dimensions** (HxWxD)	1.10 in (at front) x 11.57 in x 8.90 in 28 mm (at front) x 294 mm x 226 mm	
	Weight	Starting at 4.07 lb (1.85 kg)	
	NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 4-cell battery, hard drive and optical drive. Weight varies by configuration and components.		
	Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V
		Average Operating Power	16.9 W
		Max Operating Power	< 65 W
	Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical)
			41° to 95° F (5° to 35° C) (writing optical)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Relative Humidity	Operating	10% to 90%, non-condensing
		Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating	125 G, 2 ms, half-sine
		Non-operating	200 G, 2 ms, half-sine
	Random Vibration	Operating	0.75 grms
		Non-operating	1.50 grms
	Altitude (unpressurized)	Operating	–50 to 10,000 ft (–15.24 to 3,048 m)
		Non-operating	–50 to 40,000 ft (–15.24 to 12,192 m)
	Industry Standard Certifications	Australia & New Zealand – A-tick/C-tick	Yes
		China – CCC safety/EMC	Yes
		Hong Kong – HP DoC (CE DoC)	Yes
		Korea – MIC, eK	Yes
		Thailand	Yes
		Taiwan – BSMI	Yes
		Japan VCCI	Yes
		UL	Yes
		FCC	Yes
		CB	Yes
		GreenMark for Taiwan	Yes
		WEEE	Yes
		Energy Star	Yes*
		EPEAT	Gold**
		Singapore – PSB	Yes
		China CECP	Yes

Technical Specifications

* Configurations of the HP Compaq 2230s that are ENERGY STAR qualified are identified as HP Compaq 2230s ENERGY STAR on HP websites and on www.energystar.gov.

** EPEAT registration varies by country. See www.epeat.net for registration status by country. EPEAT status listed above applies to U.S.

HP 65W Smart AC Adapter	**Dimensions**	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	Output power 65W	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC inputOutput current limit
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	–4° to 149° F (–20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF – over 200,000 hours at 25°C ambient condition.	

Technical Specifications

4-Cell (37 WHr) Lithium-Ion battery	**Dimensions** (H x W x L)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)	
	Weight	0.55 lb (0.249 kg)	
	Cells/Type	4-cell Lithium-Ion	
	Energy	Watt-hour Capacity	37 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF
8-Cell (73 WHr) Lithium-Ion battery	**Dimensions** (H x W x L)	1.6 x 2.3 x 5.5 in (4.2 x 5.8 x 14.0 cm)	
	Weight	0.95 lb (0.430 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Watt-hour Capacity	73 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 1.5 hours when system is OFF
Displays			

Technical Specifications

12.1-inch Color TFT WXGA Display	**Active Area** (W x H)	10.3 x 6.4 in (26.1 x 16.3 cm)	
	Diagonal Size	12.1 in (30.7 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Pitch**	0.204 mm
		Format	1280 x 800
		Configuration	RGB Stripe
	Backlight	CCFL	
	PPI	125	
	Viewing Angle	±45° Horizontal, ±25° Vertical (typical)	

12.1-inch Color TFT WXGA BrightView Display	**Active Area** (W x H)	10.3 x 6.4 in (26.1 x 16.3 cm)	
	Diagonal Size	12.1 in (30.7 cm)	
	Surface Treatment	BrightView	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Pitch**	0.204 mm
		Format	1280 x 800
		Configuration	RGB Stripe
	Backlight	CCFL	
	PPI	125	
	Viewing Angle	±45° Horizontal, ±25° Vertical (typical)	

Hard Drives

Technical Specifications

500-GB 5400 rpm SATA	**Drive Weight**	0.22 lb (101 g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	150 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	2 ms
		Average	12 ms
		Maximum	22 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

320-GB 5400 rpm SATA	**Drive Weight**	0.22 lb (101 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	150 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	2 ms
		Average	12 ms
		Maximum	22 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

250-GB 5400 rpm SATA	**Drive Weight**	0.22 lb (101 g)	
	Capacity	250 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

160-GB 5400 rpm SATA	**Drive Weight**	0.22 lb (101 g)	
	Capacity	160 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

120-GB 5400 rpm SATA	**Drive Weight**	0.22 lb (101 g)	
	Capacity	120 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	234,441,648	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Removable Storage Drives

DVD-ROM Drive	**Access Times**	Random	<116 ms CD (typical)
			<125 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD- ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	None	
	Max Media Capacity (read)	4.7 GB	
	Transport	Tray loading	

Technical Specifications

DVD/CD-RW Combo Drive	**Access Times**	Random	<110 ms CD
			<130 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		24X CD-RW	3,600 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	Supported Media (write)	CD-R, CD-RW	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	700 MB	
	Transport	Tray loading	

DVD+/-RW SuperMulti DL LightScribe Drive	**Access Times**	Random	<175 ms CD
			<230 ms DVD
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		16X CD-RW	2,400 KB/s
		8X DVD+R	10,800 KB/s
		4X DVD+RW	5,400 KB/s
		8X DVD-R	10,800 KB/s
		4X DVD-RW	5,400 KB/s
		2.4X DVD+R(9)	2,700 KB/s
		5X DVD-RAM	6,750 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

Security

HP Fingerprint Sensor	**Mobile Voltage Operation**	3.0V–3.6V Single Supply
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images

Audio

Hardware	**Implementation**	ADI1984AJCPZ High Definition CODEC
	Touch-Sensitive Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Sound Blaster Pro compatible	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes
Audio Output Quality	**Frequency Response**	20 Hz – 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHz – 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit
Integrated Stereo Speakers	**Power Rating**	1.5 Watts
	Impedance	4 Ohms

Technical Specifications

Communications

V.92 56K Data/Fax Modem	**Form Factor**	MDC 1.5 Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/ Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	V.92 data V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) **Optional symbol rates:** 2800, 3429 Asymmetric Symbol rates **Synchronous primary channel data signaling rates:** 3600, 31200 Automatic rate re-negotiation V.34 V.32bis V.32 V.23 V.22bis V.22 V.21 Bell 212A Bell 103J
	Fax Mode Capabilities	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2
	Command Set	V.250 (Partial) TIA-602 Identification: +GMI, +GMM, +GMR Port control: +IPR, +ICF, +IFC, +ILRR Modulation: +MS, +MR, +MA Error control: +ES, +ER, +EB, +ESR, +ETBM Data compression: +DS, +DR V.251
Intel WiFi Link 5100	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g

Technical Specifications

	IEEE 802.11n (draft 2.0)	
Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)	
Frequency Band	2.4 GHz and 5 GHz	
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n (draft) specification	
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM	
Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.	
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power (for CCK)[2]	15 dBm	
Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Transmit: 2.3 Watts (average, with one spatial streams) Receive: 1.9 Watts (average with two receive chains) Idle mode[3]: 30 mW (average) Radio off: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	300 Mbps: -68 dBm, 54 Mbps: -74 dBm, 6 Mbps: -90 dBm	
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance	
Range	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	

Technical Specifications

Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3V +/- 9%, 1.5V +/- 5%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 90% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
Configuration Utility[5]	Microsoft Windows XP Choice of Configuration Utility: • Microsoft Windows XP Wireless Network Connection Manager • Intel PROSet for Microsoft Windows XP (required for Cisco Compatible Extensions support) Microsoft Windows Vista • Microsoft Windows Vista Wireless Network Connection Manager. • Intel IHV extensions for Windows Vista available to support Cisco Compatible Extensions.	
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Broadcom 4312G 802.11b/g WiFi Adapter	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2,

	LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.	
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Network Architecture **Models**	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power (for CCK)[2]	17 dBm	
Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Idle associated: 250 mW Idle unassociated: 150 mW Transmit: 2.0 W (max) Receive: 2.0 W (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	54 Mbps: -71 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm	
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	14° to 149° F (–10° to 65° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
Configuration Utility[4]	Microsoft Windows XP Choice of Configuration Utility: • Microsoft Windows XP Wireless Network Connection Manager • Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) Microsoft Windows Vista	

- Microsoft Windows Vista Wireless Network Connection Manager
- Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

LED Activity LED Off – Radio OFF; Solid LED On – Radio ON

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Broadcom 4322AGN 802.11a/b/g/draft-n WiFi Adapter	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft 2.0)
	Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 6, 6.5, 9, 12, 13, 13.5, 18, 19.5, 24, 26, 27, 36, 39, 40.5, 48, 52, 54, 58.5, 65, 78, 81, 104, 108, 117, 121.5, 130, 135, 162, 216, 243, 270, 300 Mbps
	Frequency Support	20 MHz: 2.4 GHz and 5 GHz bands 40 MHz: 2.4 GHz and 5 GHz band
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	Security[1]	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points

Technical Specifications

Output Power (for CCK)[2]	17 dBm	
Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Idle associated: 250 mW Idle unassociated: 150 mW Transmit/Receive 20 MHz channel: 2.0 W (max) Transmit/Receive 40 MHz channel: 2.0 W (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	270 Mbps: -66dBm, 162 Mbps: -72 dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -94 dBm	
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	14° to 149° F (–10° to 65° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
Configuration Utility[4]	Microsoft Windows XP Choice of Configuration Utility: • Microsoft Windows XP Wireless Network Connection Manager • Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) Microsoft Windows Vista • Microsoft Windows Vista Wireless Network Connection Manager • Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.	
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

HP Integrated Module with Bluetooth Wireless Technology	**Bluetooth Specification**	2.0 Compliant	
	Dimensions	1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)	
	Frequency Band	2402 to 2480 MHz	
	Number of Available Channels	79 (1 MHz) available channels	
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps	
		Synchronous Connection Oriented links up to 3, 64 kbps, voice channels	
		Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric	
	Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)	
	Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate	
	Power Consumption	Peak (Tx) 264 mW	
		Peak (Rx) 231 mW	
		Sleep <1 mW	
	Antenna	Internally integrated within module	
	Range	Up 33 ft (10 m)	
	Electrical Interface	USB 2.0 compliant	
		Microsoft Windows Plug and Play compliant	
	OS Support	Microsoft Windows XP Professional and Home	
		Microsoft Windows 2000	
	Bluetooth Software Supported	Broadcom Bluetooth for Windows	
		Microsoft Windows XP Bluetooth Software	
	Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves	
	Security	Full support of Bluetooth Security Provisions	
	Power Management	Microsoft Windows ACPI, and USB Bus Support	
		Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
	Certifications	All necessary regulatory approvals for supported countries, including:	
		FCC (47 CFR) Part 15C, Section 15.247 & 15.249	
		ETS 300 328, ETS 300 826	
		Low Voltage Directive IEC950	
		UL, CSA, and CE Mark	
	Temperature	Operating	–4° to 158° F (–20° to 70° C)
		Non-operating	–40° to 176° F (–40° to 80° C)
	Humidity	Operating	10% to 90%
		Non-operating	5% to 95%

Technical Specifications

Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
Bluetooth Profiles Supported	(with Bluetooth for Windows 4.0 software)	
	Serial Port Profile (SPP)*	
	Dial-Up Networking (DUN)*	
	Generic Object Exchange Profile (GOEP)	
	Object Push Profile (OPP)*	
	File Transfer Profile (FTP)	
	Synchronization Profile (SYNC)	
	Hard Copy Cable Replacement (HCRP)*	
	Personal Area Networking Profile (PAN)*	
	Human Interface Device Profile (HID)*	
	FAX Profile (FAX)	
	Basic Imaging Profile (BIP)	
	Headset Profile (HSP)	
	Hands Free Profile (HFP)	
	Advanced Audio Distribution Profile (A2DP)	

* indicates the profile is also supported by Microsoft Windows XP SP2

Environmental Data

Eco-Label Certifications

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Star
- Taiwan Green Mark
- IT ECO declaration
- EPEAT – Gold
- Korea ECO label

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Convertible Mini tower Desktop model is based on a "Typically Configured Notebook"

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	11.83 W	12.09 W	11.55 W
Sleep (Energy Star low power mode)	1.137 W	1.182 W	1.127 W
Off	0.835 W	0.862 W	0.817 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	41 BTU/hr	41 BTU/hr	40 BTU/hr
Sleep	4 BTU/hr	4 BTU/hr	4 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.1	26
Operation	3.1	26

Batteries

This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 4000 ppm by weight.

The battery type and chemistry used in the product is:
CR2032 (coin cell), Lithium
8-cell high capacity Lithium-Ion battery

Additional information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see: www.epeat.net

Keyboard complies with ISO standard: ISO 9995, EN 29241-4, and ISO/IEC 15412

Input devices of this product comply with ISO 9241, part 9.

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% recycled materials (by wt.)

This product is greater than 99% recycle-able when properly disposed of at

end of life.

Packaging Materials

- External:
  - CANON bags – several layers – 15 g
  - Corrugated carton – 440g
  - Cardboard & misc. – 245g
- Internal:
  - EPE-Expanded Polyethylene – 80 g

- The EPE foam packaging material is made from 100% recycled content.
- The corrugated paper packaging materials contains at least 100% recycled content.

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment (http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel– finishes must not be used on the external surface designed to be frequently handled or carried by the user.

	• Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Environment website http://www.hp.com/environment Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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